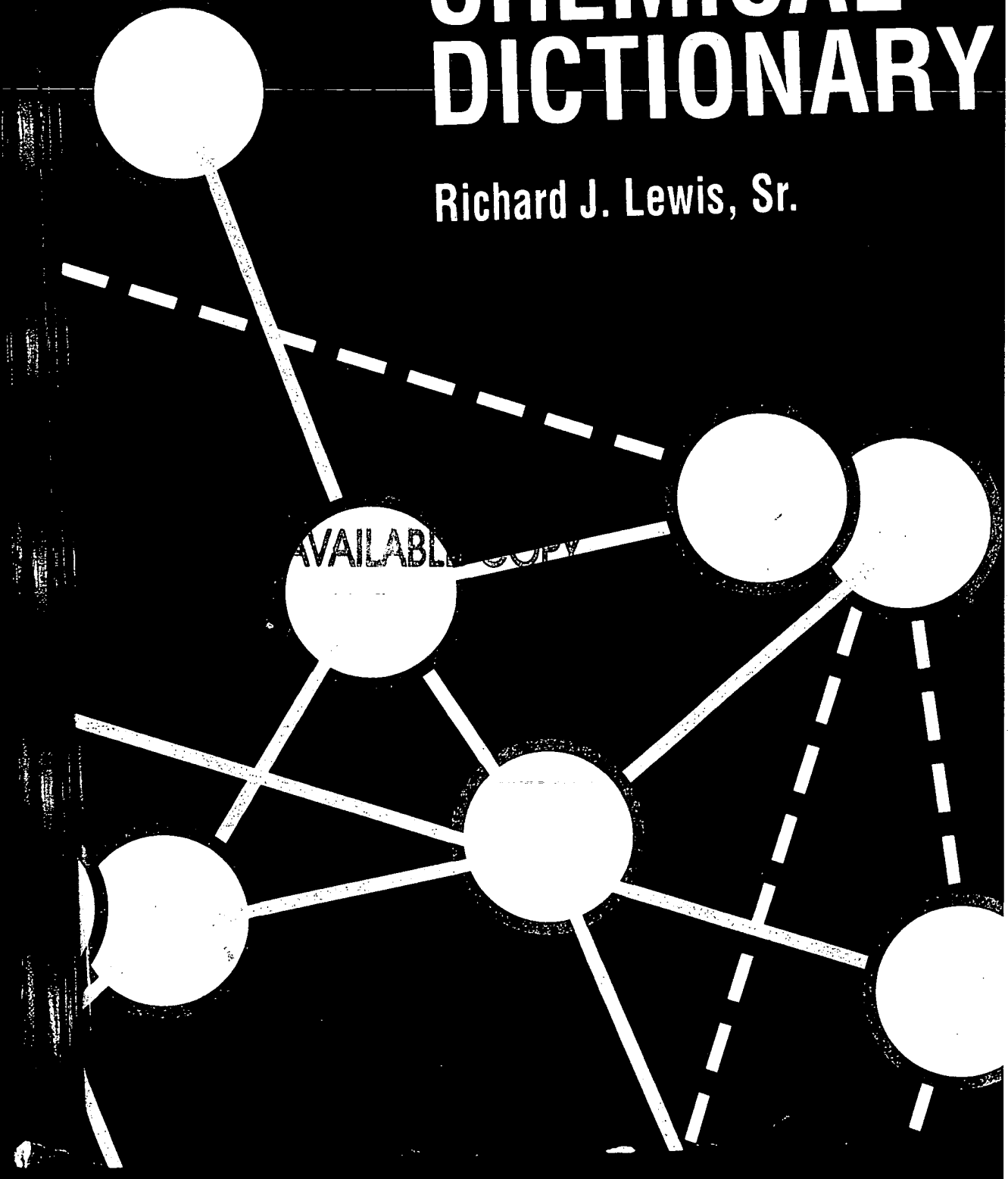
Hawley's CONDENSED CHEMICAL DICTIONARY

Twelfth Edition

Richard J. Lewis, Sr.



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Dictionary

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Revised by

Richard J. Lewis, Sr.

VNR VAN NOSTRAND REINHOLD COMPANY
New York

An oxetane group (=$COCH_2C$=) is one kind of epoxy group.
See "Penton."

oxidase. An enzyme whose activity results in the transfer of electrons on the substrate; an oxidizing enzyme.

oxidation. The term "oxidation" originally meant a reaction in which oxygen combines chemically with another substance, but its usage has long been broadened to include any reaction in which electrons are transferred. Oxidation and reduction always occur simultaneously (redox reactions), and the substance that gains electrons is termed the oxidizing agent. For example, cupric ion is the oxidizing agent in the reaction: Fe (metal) + $Cu^{++} \rightarrow Fe^{++}$ + Cu (metal); here, two electrons, (negative charges) are transferred from the iron atom to the copper atom; thus, the iron becomes positively charged (is oxidized) by loss of two electrons while the copper receives the two electrons and becomes neutral (is reduced). Electrons may also be displaced within the molecule without being completely transferred from it. Such partial loss of electrons likewise constitutes oxidation in its broader sense and leads to the application of the term to a large number of processes that at first sight might not be considered to be oxidations. Reaction of a hydrocarbon with a halogen, e.g., $CH_4 + 2Cl \rightarrow CH_3Cl + HCl$, involves partial oxidation of the methane; halogen addition to a double bond is regarded as an oxidation.

Dehydrogenation is also a form of oxidation, when two hydrogen atoms, each having one electron, are removed from a hydrogen-containing organic compound by a catalytic reaction with air or oxygen, as in oxidation of alcohols to aldehydes.
See dehydrogenation.

oxidation number. The number of electrons that must be added to or subtracted from an atom in a combined state to convert it to the elemental form; i.e., in barium chloride ($BaCl_2$), the oxidation number of barium is +2 and of chlorine is −1. Many elements can exist in more than one oxidation state.
See also valence.

oxidation-reduction indicator. A substance that has a color in the oxidized form different from that of the reduced form, and can be reversibly oxidized and reduced. Thus, if diphenylamine is present in a ferrous sulfate solution to which potassium dichromate is being added, a violet color appears with the first drop of excess dichromate.
See also indicator.

oxidative coupling. A polymerization technique for certain types of linear high polymers. Oxidation of 2,6-dimethylphenol with an amine complex of a copper salt as catalyst forms a polyether, with splitting off of water. The product is soluble in aromatic and chlorinated hydrocarbons; insoluble in alcohols, ketones, and aliphatics. It is thermoplastic and unaffected by acids, bases, and detergents. It has a very broad, useful temperature range (from −170 to +190C). It is also dimensionally stable and has good electrical resistance. Oxidative coupling of diacetylenes and dithiols also yields promising polymers.
See also "PPO."

oxide. A mineral in which metallic atoms are bonded to oxygen atoms.

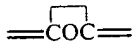
oxidizing material. Any compound that spontaneously evolves oxygen either at room temperature or under slight heating. The term includes such chemicals as peroxides, chlorates, perchlorates, nitrates, and permanganates. These can react vigorously at ambient temperatures when stored near or in contact with reducing materials such as cellulosic and other organic compounds. Storage areas should be well ventilated and kept as cool as possible.

oxine. See 8-hydroxyquinoline.

oxirane. CAS: 75-21-8.

H_2COCH_2.

A synonym for ethylene oxide. An oxirane group is one having the structure



and is one kind of epoxy group.
See ethylene oxide.

Oxirane process. A method of making ethylene glycol by catalytic oxidation of ethylene to the diacetate, which is then hydrolyzed to ethylene glycol.

oxirene. (oxacyclopropene). An organic intermediate containing four π electrons, reported to result from oxidation of acetylene.

2-oxohexamethylenimine. See caprolactam.

"Oxone" [*Du Pont*]. TM for an acidic, white, granular, free-flowing solid containing the active ingredient potassium peroxymonosulfate; readily soluble in water; 1% solution has pH of